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DISCUSSION OF PROCEEDINGS PAPERS

392, 552, 645

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Current discussion of papers sponsored by the Sanitary Engineering Division is presented as follows:

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645	The Removal of Color from TNT Waste, by Gail P. Edwards and William T. Ingram. (March, 1955. Prior discussion; None. Discussion closed)	
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Discussion of
"POLLUTION OF THE MISSISSIPPI RIVER NEAR NEW ORLEANS"

by Frank W. Macdonald
(Proc. Paper 552)

F. W. MACDONALD,[1] M. ASCE.—The author is greatly indebted to Messrs. C. G. Gunnerson and Jere W. Higgs, Jr. for their constructive comments and additional information submitted on the problems experienced in establishing suitable bacterial standards for surface waters.

In his paper, the writer endeavored to present information obtained from a survey covering a relatively small section of the Mississippi river. Some aspects of the data because of this limitation cannot readily be accounted for.

It is anticipated that in the near future the survey will be extended to cover a greater section of the river and that the study will be performed over a longer period of time. The information we are endeavoring to obtain is greatly needed for the future development of the highly industrialized areas in the vicinity of New Orleans. The problem confronting us in continuing this survey is in finding the technical services and the financial assistance to conduct the work.

1. Associate Prof., School of Civ. Eng., Tulane Univ., New Orleans, La.

Discussion of
"THE REMOVAL OF COLOR FROM TNT WASTE"

by Gail P. Edwards and William T. Ingram
(Proc. Paper 645)

RALPH STONE,[1] A.M. ASCE.—The treatment of TNT containing effluents is one of the more interesting and complex industrial waste stabilization problems. "Red water" as it has been called by those working with the partially oxidized waste, has proven to be expensive and hard to treat. Messrs Edwards and Ingram present pertinent data on the oxidation of TNT sellite wastes with chlorine. They conclude that 9000 ppm of chlorine can remove 90% of the color in a waste water. This new information should enable the proper use of chlorination as a TNT treatment method.

The writer has worked upon a particular industrial treatment plant which in part included TNT sellite wastes as a effluent component. Empirical observations and limited analytical data has resulted in the development of certain personal ideas that supplement the original paper.

Treatment Cost and Other Criteria

Possible treatment methods for TNT wastes include: evaporation, solvent extraction, ion exchange, chemical dosage, activated carbon adsorption, chlorination, aerobic biological oxidation, anaerobic digestion, ponding, spraying on soil, and dilution within water bodies.

The choice of treatment method is controlled by criteria such as cost, removal efficiency, safety, and regulations of various agencies. Obviously, each plant must be evaluated on the basis of local factors pertaining to the availability of land, diluting water, climate, trained personnel and other considerations.

General Methods of Minimizing TNT Waste Water Production

General methods for reducing TNT pollution include (1) process water conservation and (2) TNT waste water reclamation and recycling.

Process water conservation may be promoted by: Limiting the use of process water that is in contact with the TNT, automatic shut off valves where applicable, and a continuous water use plant personnel education campaign.

TNT has limited solubility in water. Hence recirculation of settled waste water, when feasible, can reduce the overall quantity of effluent produced for ultimate disposal. Sedimentation sumps enable the collection of the settled TNT sludge; this removal of TNT solids thereby reduces the quantity of TNT that can dissolve into unsaturated water. Separate TNT waste sewers help segregate and limit the quantity of effluent.

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Adsorption on Soil

Adsorption of TNT on activated carbon has been reported[2] to be a method of TNT removal. Soils, particularly clay and loam, which contain considerable colloidal content appear to be good adsorption agents. Edwards and Ingram indicate that the cost of adsorption treatment is high; the use of soil may make the process economical.

Biological Treatment

TNT is a toxic nitrogenous compound that is fairly stable. Edwards and Ingram are correct in stating that TNT color is resistant to conventional biological treatment. However, in dilute concentrations it will not interfere with biological processes. Wilkinson[3] reports that up to 60 ppm TNT did not interfere with anaerobic sludge digestion or 30 ppm with a trickling filter operating on sanitary sewage. Basic biological theory indicates that at dilute concentrations, with an adequate carbon to nitrogen ratio, the TNT should slowly decompose.

The ability of soil colloids to adsorb TNT, and the subsequent biological action indicate that sprinkler irrigation at low loading rates can be a feasible treatment method. In addition the cover vegetation should be able to utilize the nitrogen decomposition products as fertilizer.

Oxidation ponds present another example of a dilution-storage-biological treatment system. Trickling filters and other conventional treatment methods do not provide enough contact time to remove the color of TNT wastes.

The direct dilution of TNT wastes into a receiving water at low concentrations is an effective disposal method. At less than 1 ppm the red color is scarcely noticeable.

Chlorination

The works of Messrs. Edwards and Ingram are valuable in providing a method for treatment of TNT wastes with chlorine. It can be used as a standby system in conjunction with other treatment, or if economically feasible at a particular installation, it may be a primary treatment system.

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2. TNT Waste. Schott, Stuart, Ruchoft, C.C., and Megregian, S. Industrial And Engineering Chemistry. 35, 1122-1127 (Oct. 1943).
3. Treatment and Disposal of Sewage and Waste Waters From Shell-Filling Factories. Wilkinson, R. W. Institute of Sewage Purification Journal and Proceedings, Part I, pp. 145-150, 1945.

PROCEEDINGS PAPERS

The technical papers published in the past year are presented below. Technical-division sponsorship is indicated by an abbreviation at the end of each Paper Number, the symbols referring to: Air Transport (AT), City Planning (CP), Construction (CO), Engineering Mechanics (EM), Highway (HW), Hydraulics (HY), Irrigation and Drainage (IR), Power (PO), Sanitary Engineering (SA), Soil Mechanics and Foundations (SM), Structural (ST), Surveying and Mapping (SU), and Waterways (WW) divisions. For titles and order coupons, refer to the appropriate issue of "Civil Engineering" or write for a cumulative price list.

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c. Discussion of several papers, grouped by Divisions.

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